

ISSN (ONLINE):2045-8711

ISSN (PRINT):2045-869X

# International Journal of Innovative Technology and Creative Engineering

September 2024

Vol-14 No:-9

@ IJITCE Publication

**UK: Managing Editor**

International Journal of Innovative Technology and Creative Engineering  
1a park lane,  
Cranford  
London  
TW59WA  
UK

**USA: Editor**

International Journal of Innovative Technology and Creative Engineering  
Dr. Arumugam  
Department of Chemistry  
University of Georgia  
GA-30602, USA.

**India: Editor**

International Journal of Innovative Technology & Creative Engineering  
36/4 12<sup>th</sup> Avenue,  
1<sup>st</sup> cross St,  
Vaigai Colony  
Ashok Nagar  
Chennai, India 600083

Email: [editor@ijitce.co.uk](mailto:editor@ijitce.co.uk)

**[www.ijitce.co.uk](http://www.ijitce.co.uk)**



IJITCE PUBLICATION

# ***International Journal of Innovative Technology & Creative Engineering***

Vol.14 No.09

September 2024



**[www.ijitce.co.uk](http://www.ijitce.co.uk)**

Dear Researcher,

Greetings!

Articles in this issue discusses about trends in OTP-based IoT door-lock technology.

We look forward many newer technologies in the next month.

Thanks,  
Editorial Team  
IJITCE

## Editorial Members

**Dr. Chee Kyun Ng Ph.D**

Department of Computer and Communication Systems,  
Faculty of Engineering,Universiti Putra Malaysia,UPMSerdang, 43400 Selangor,Malaysia.

**Dr. Simon SEE Ph.D**

Chief Technologist and Technical Director at Oracle Corporation, Associate Professor (Adjunct) at Nanyang Technological University  
Professor (Adjunct) at ShanghaiJiaotong University, 27 West Coast Rise #08-12,Singapore 127470

**Dr. sc.agr. Horst Juergen SCHWARTZ Ph.D,**

Humboldt-University of Berlin,Faculty of Agriculture and Horticulture,Asternplatz 2a, D-12203 Berlin,Germany

**Dr. Marco L. BianchiniPh.D**

Italian National Research Council; IBAF-CNR,ViaSalaria km 29.300, 00015 MonterotondoScalo (RM),Italy

**Dr. NijadKabbaraPh.D**

Marine Research Centre / Remote Sensing Centre/ National Council for Scientific Research,  
P. O. Box: 189 Jounieh,Lebanon

**Dr. Aaron Solomon Ph.D**

Department of Computer Science,  
National Chi Nan University,No. 303, University Road,Puli Town, Nantou County 54561,Taiwan

**Dr. Arthanariee. A. M M.Sc.,M.Phil.,M.S.,Ph.D**

Director - Bharathidasan School of Computer Applications, Ellispettai, Erode, Tamil Nadu,India

**Dr. Takaharu KAMEOKA, Ph.D**

Professor, Laboratory of Food,  
Environmental & Cultural Informatics Division of Sustainable Resource Sciences,  
Graduate School of Bioresources,Mie University, 1577 Kurimamachiya-cho, Tsu, Mie, 514-8507, Japan

**Dr. M. Sivakumar M.C.A.,ITIL.,PRINCE2.,ISTQB.,OCP.,ICP. Ph.D.**

Technology Architect, Healthcare and Insurance Industry, Chicago, USA

**Dr. Bulent AcmaPh.D**

Anadolu University,  
Department of Economics,Unit of Southeastern Anatolia Project(GAP),26470 Eskisehir,TURKEY

**Dr. SelvanathanArumugamPh.D**

Research Scientist, Department of Chemistry, University of Georgia, GA-30602,USA.

**Dr. S.Prasath Ph.D**

Assistant Professor, School of Computer Science, VETInstitute of Arts & Science (Co-Edu) College, Erode, Tamil Nadu, India

**Dr. P.Periyasamy, M.C.A.,M.Phil.,Ph.D.**

Associate Professor, Department of Computer Science and Applications, SRM Trichy Arts and Science College, SRM Nagar, Trichy - Chennai  
Highway, Near Samayapuram, Trichy - 621 105,

**Mr. V N PremAnand**

Secretary, Cyber Society of India

## Review Board Members

**Dr. RajaramVenkataraman**

Chief Executive Officer, Vel Tech TBI || Convener, FICCI TN State Technology Panel || Founder, Navya Insights || President, SPIN Chennai

**Dr. Paul Koltun**

Senior Research ScientistLCA and Industrial Ecology Group,Metallic& Ceramic Materials,CSIRO Process Science & Engineering Private Bag 33, Clayton South MDC 3169, Gate 5 Normanby Rd., Clayton Vic. 3168, Australia

**Dr. Zhiming Yang MD., Ph. D.**

Department of Radiation Oncology and Molecular Radiation Science,1550 Orleans Street Rm 441, Baltimore MD, 21231,USA

**Dr. Jifeng Wang**

Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign Urbana, Illinois, 61801, USA

**Dr. Giuseppe Baldacchini**

ENEA - Frascati Research Center, Via Enrico Fermi 45 - P.O. Box 65,00044 Frascati, Roma, ITALY.

**Dr. MutamedTurkiNayefKhatib**

Assistant Professor of Telecommunication Engineering,Head of Telecommunication Engineering Department,Palestine Technical University (Kadoorie), TulKarm, PALESTINE.

**Dr.P.UmaMaheswari**

Prof &Head,Depaartment of CSE/IT, INFO Institute of Engineering,Coimbatore.

**Dr. T. Christopher, Ph.D.,**

Assistant Professor &Head,Department of Computer Science,Government Arts College(Autonomous),Udumalpet, India.

**Dr. T. DEVI Ph.D. Engg. (Warwick, UK),**

Head,Department of Computer Applications,Bharathiar University,Coimbatore-641 046, India.

**Dr. Renato J. orsato**

Professor at FGV-EAESP,Getulio Vargas Foundation,São Paulo Business School,Rualtapeva, 474 (8° andar),01332-000, São Paulo (SP), Brazil  
Visiting Scholar at INSEAD,INSEAD Social Innovation Centre,Boulevard de Constance,77305 Fontainebleau - France

**Y. BenalYurtlu**

Assist. Prof. OndokuzMayis University

**Dr.Sumeer Gul**

Assistant Professor,Department of Library and Information Science,University of Kashmir,India

**Dr. ChutimaBoonthum-Denecke, Ph.D**

Department of Computer Science,Science& Technology Bldg., Rm 120,Hampton University,Hampton, VA 23688

**Dr. Renato J. Orsato**

Professor at FGV-EAESP,Getulio Vargas Foundation,São Paulo Business SchoolRualtapeva, 474 (8° andar),01332-000, São Paulo (SP), Brazil

**Dr. Lucy M. Brown, Ph.D.**

Texas State University,601 University Drive,School of Journalism and Mass Communication,OM330B,San Marcos, TX 78666

**JavadRobati**

Crop Production Departement,University of Maragheh,Golshahr,Maragheh,Iran

**VineshSukumar (PhD, MBA)**

Product Engineering Segment Manager, Imaging Products, Aptina Imaging Inc.

**Dr. Binod Kumar PhD(CS), M.Phil.(CS), MIAENG,MIEEE**

Professor, JSPM's RajarshiShahu College of Engineering, MCA Dept., Pune, India.

**Dr. S. B. Warkad**

Associate Professor, Department of Electrical Engineering, Priyadarshini College of Engineering, Nagpur, India

**Dr. doc. Ing. RostislavChoteborský, Ph.D.**

Katedramateriálu a strojírenskétechnologieTechnickáfakulta,Ceskázemedelskáuniverzita v Praze,Kamýčká 129, Praha 6, 165 21

**Dr. Paul Koltun**

Senior Research Scientist LCA and Industrial Ecology Group, Metallic & Ceramic Materials, CSIRO Process Science & Engineering Private Bag 33, Clayton South MDC 3169, Gate 5 Normanby Rd., Clayton Vic. 3168

**DR. Chutima Boonthum-Denecke, Ph.D**

Department of Computer Science, Science & Technology Bldg., Hampton University, Hampton, VA 23688

**Mr. Abhishek Taneja B.sc(Electronics), M.B.E, M.C.A., M.Phil.,**

Assistant Professor in the Department of Computer Science & Applications, at Dronacharya Institute of Management and Technology, Kurukshetra. (India).

**Dr. Ing. Rostislav Chotěborský, ph.d,**

Katedra materiálu a strojírenské technologie, Technická fakulta, Česká zemědělská univerzita v Praze, Kamýcká 129, Praha 6, 165 21

**Dr. Amala Vijaya Selvi Rajan, B.sc, Ph.d,**

Faculty – Information Technology Dubai Women's College – Higher Colleges of Technology, P.O. Box – 16062, Dubai, UAE

**Naik Nitin Ashokrao B.sc, M.Sc**

Lecturer in Yeshwant Mahavidyalaya Nanded University

**Dr. A. Kathirvell, B.E, M.E, Ph.D, MISTE, MIACSIT, MENG**

Professor - Department of Computer Science and Engineering, Tagore Engineering College, Chennai

**Dr. H. S. Fadewar B.sc, M.sc, M.Phil., ph.d, PGDBM, B.Ed.**

Associate Professor - Sinhgad Institute of Management & Computer Application, Mumbai-Bangalore Western Express Way Narhe, Pune - 41

**Dr. David Batten**

Leader, Algal Pre-Feasibility Study, Transport Technologies and Sustainable Fuels, CSIRO Energy Transformed Flagship Private Bag 1, Aspendale, Vic. 3195, AUSTRALIA

**Dr R C Panda**

(M.Tech & PhD (IITM); Ex-Faculty (Curtin Univ Tech, Perth, Australia)) Scientist CLRI (CSIR), Adyar, Chennai - 600 020, India

**Miss Jing He**

PH.D. Candidate of Georgia State University, 1450 Willow Lake Dr. NE, Atlanta, GA, 30329

**Jeremiah Neubert**

Assistant Professor, Mechanical Engineering, University of North Dakota

**Hui Shen**

Mechanical Engineering Dept, Ohio Northern Univ.

**Dr. Xiangfa Wu, Ph.D.**

Assistant Professor / Mechanical Engineering, NORTH DAKOTA STATE UNIVERSITY

**Seraphin Chally Abou**

Professor, Mechanical & Industrial Engineering Department, MEHS Program, 235 Voss-Kovach Hall, 1305 Ordean Court, Duluth, Minnesota 55812-3042

**Dr. Qiang Cheng, Ph.D.**

Assistant Professor, Computer Science Department Southern Illinois University Carbondale Faner Hall, Room 2140-Mail Code 45111000 Faner Drive, Carbondale, IL 62901

**Dr. Carlos Barrios, PhD**

Assistant Professor of Architecture, School of Architecture and Planning, The Catholic University of America

**Y. Benal Yurtlu**

Assist. Prof. Ondokuz Mayıs University

**Dr. Lucy M. Brown, Ph.D.**

Texas State University, 601 University Drive, School of Journalism and Mass Communication, OM330B, San Marcos, TX 78666

**Dr. Paul Koltun**

Senior Research Scientist LCA and Industrial Ecology Group, Metallic & Ceramic Materials CSIRO Process Science & Engineering

**Dr. Sumeer Gul**

Assistant Professor, Department of Library and Information Science, University of Kashmir, India

**Dr. Chutima Boonthum-Denecke, Ph.D**

Department of Computer Science, Science & Technology Bldg., Rm 120, Hampton University, Hampton, VA 23688

**Dr. Renato J. Orsato**

Professor at FGV-EAESP, Getulio Vargas Foundation, São Paulo Business School, Rualtapeva, 474 (8º andar) 01332-000, São Paulo (SP), Brazil

**Dr. Wael M. G. Ibrahim**

Department Head-Electronics Engineering Technology Dept. School of Engineering Technology ECPI College of Technology 5501 Greenwich Road - Suite 100, Virginia Beach, VA 23462

**Dr. Messaoud Jake Bahoura**

Associate Professor-Engineering Department and Center for Materials Research Norfolk State University, 700 Park avenue, Norfolk, VA 23504

**Dr. V. P. Eswaramurthy M.C.A., M.Phil., Ph.D.,**

Assistant Professor of Computer Science, Government Arts College (Autonomous), Salem-636 007, India.

**Dr. P. Kamakkannan, M.C.A., Ph.D.,**

Assistant Professor of Computer Science, Government Arts College (Autonomous), Salem-636 007, India.

**Dr. V. Karthikeyani Ph.D.,**

Assistant Professor of Computer Science, Government Arts College (Autonomous), Salem-636 008, India.

**Dr. K. Thangadurai Ph.D.,**

Assistant Professor, Department of Computer Science, Government Arts College (Autonomous), Karur - 639 005, India.

**Dr. N. Maheswari Ph.D.,**

Assistant Professor, Department of MCA, Faculty of Engineering and Technology, SRM University, Kattangulathur, Kanchipuram Dt - 603 203, India.

**Mr. Md. Musfique Anwar B.Sc (Engg.)**

Lecturer, Computer Science & Engineering Department, Jahangirnagar University, Savar, Dhaka, Bangladesh.

**Mrs. Smitha Ramachandran M.Sc (CS),**

SAP Analyst, Akzonobel, Slough, United Kingdom.

**Dr. V. Vallimayil Ph.D.,**

Director, Department of MCA, Vivekanandha Business School For Women, Elayampalayam, Tiruchengode - 637 205, India.

**Mr. M. Moorthi M.C.A., M.Phil.,**

Assistant Professor, Department of computer Applications, Kongu Arts and Science College, India

**Prema Selvaraj Bsc, M.C.A, M.Phil**

Assistant Professor, Department of Computer Science, KSR College of Arts and Science, Tiruchengode

**Mr. G. Rajendran M.C.A., M.Phil., N.E.T., PGDBM., PGDBF.,**

Assistant Professor, Department of Computer Science, Government Arts College, Salem, India.

**Dr. Pradeep H Pendse B.E., M.M.S., Ph.D**

Dean - IT, Welinkar Institute of Management Development and Research, Mumbai, India

**Muhammad Javed**

Centre for Next Generation Localisation, School of Computing, Dublin City University, Dublin 9, Ireland

**Dr. G. GOBI**

Assistant Professor-Department of Physics, Government Arts College, Salem - 636 007

**Dr. S. Senthilkumar**

Post Doctoral Research Fellow, (Mathematics and Computer Science & Applications), Universiti Sains Malaysia, School of Mathematical Sciences, Pulau Pinang-11800, [PENANG], MALAYSIA.

**Manoj Sharma**

Associate Professor Deptt. of ECE, Prannath Parnami Institute of Management & Technology, Hissar, Haryana, India



**RAMKUMAR JAGANATHAN**

Asst-Professor, Dept of Computer Science, V.L.B Janakiammal college of Arts & Science, Coimbatore, Tamilnadu, India

**Dr. S. B. Warkad**

Assoc. Professor, Priyadarshini College of Engineering, Nagpur, Maharashtra State, India

**Dr. Saurabh Pal**

Associate Professor, UNS Institute of Engg. & Tech., VBS Purvanchal University, Jaunpur, India

**Manimala**

Assistant Professor, Department of Applied Electronics and Instrumentation, St Joseph's College of Engineering & Technology, Choondacherry Post, Kottayam Dt. Kerala -686579

**Dr. Qazi S. M. Zia-ul-Haque**

Control Engineer Synchrotron-light for Experimental Sciences and Applications in the Middle East (SESAME), P. O. Box 7, Allan 19252, Jordan

**Dr. A. Subramani, M.C.A., M.Phil., Ph.D.**

Professor, Department of Computer Applications, K.S.R. College of Engineering, Tiruchengode - 637215

**Dr. Seraphin Chally Abou**

Professor, Mechanical & Industrial Engineering Depart. MEHS Program, 235 Voss-Kovach Hall, 1305 Ordean Court Duluth, Minnesota 55812-3042

**Dr. K. Kousalya**

Professor, Department of CSE, Kongu Engineering College, Perundurai-638 052

**Dr. (Mrs.) R. Uma Rani**

Asso.Prof., Department of Computer Science, Sri Sarada College For Women, Salem-16, Tamil Nadu, India.

**MOHAMMAD YAZDANI-ASRAMI**

Electrical and Computer Engineering Department, Babol "Noshirvani" University of Technology, Iran.

**Dr. Kulasekharan, N, Ph.D**

Technical Lead - CFD, GE Appliances and Lighting,  
GE India, John F Welch Technology Center, Plot # 122, EPIP, Phase 2, Whitefield Road, Bangalore – 560066, India.

**Dr. Manjeet Bansal**

Dean (Post Graduate), Department of Civil Engineering, Punjab Technical University, Giani Zail Singh Campus, Bathinda -151001 (Punjab), INDIA

**Dr. Oliver Jukić**

Vice Dean for education, Virovitica College, Matije Gupca 78, 33000 Virovitica, Croatia

**Dr. Lori A. Wolff, Ph.D., J.D.**

Professor of Leadership and Counselor Education, The University of Mississippi, Department of Leadership and Counselor Education, 139 Guyton University, MS 38677

## Contents

OTP BASED IOT DOOR LOCKING SYSTEM	..... [1634]
-----------------------------------	--------------

# OTP BASED IOT DOOR LOCKING SYSTEM

**ANANTHARAMAN.P**

MECHANICAL DEPARTMENT-Kritilabs TECHNOLOGIES Pvt Ltd  
Dr.VSI INDUSTRIEL ESTATE PHASE -2, THIRUVANMIYUR,  
CHENNAI-6000041, TAMIL NADU, INDIA.

**ABSTRACT—** In the twenty-first century, security has grown to be a top priority; people now want to feel secure at home, at work, and globally. The project's goal is to improve and advance the safety and security of people's lives and property by developing a smart door security system using Arduino and Bluetooth applications. The initiative mainly focuses on protecting doors and enhancing their security in our homes, workplaces, or public buildings. With the aid of smart doors, the doors are protected primarily to allow access to only authorised people using their cell phones and GSM application usage when inside or while you are away from your home and workplace. The study mostly discusses how to safeguard doors and increase their security. With the rapid increase in single household, vulnerability to crime is emerging as a significant social issue, particularly for single female families who face heightened anxiety about strangers. To address this concern, we propose an OTP-based IoT door-lock equipped with features such as OTP password generation, remote control, image storage, and live streaming. Additionally, a smartphone app complements the system by providing real-time video monitoring, door lock control, and event logging.

Keywords: Digital Door-lock, IoT, Security, OTP

## I. INTRODUCTION

The increase in the number of single-person households is leading to various new social problems, including challenges related to rescue activities in emergencies, housebreaking, and theft. Multi-unit housing, the predominant residential type for single-person households, often features digitized entrance locks, which use passwords, RFID tags, or biometrics for authentication. However, due to their affordability and convenience, passwords are commonly used, even in systems that also incorporate RFID or biometric technologies. This reliance on passwords necessitates careful management to prevent leaks, including periodic changes, which are often neglected due to inconvenience and a lack of security awareness. Additionally, passwords can

be compromised through methods such as UV light or hidden cameras.

In this paper, we propose applying OTP (One Time Password) technology to address password leakage issues and integrate real-time monitoring via a camera module into password-based digital door locks. This approach aims to enhance security and reduce anxiety associated with unfamiliar visitors. Furthermore, we explore the design and implementation of an IoT-based remote authentication door lock system, which allows for password issuance and changes, image monitoring, and event logging via smartphone apps, and we develop a prototype of this system.

## II. REVIEW OF LITERATURE

### A. *OTP based door lock system:*

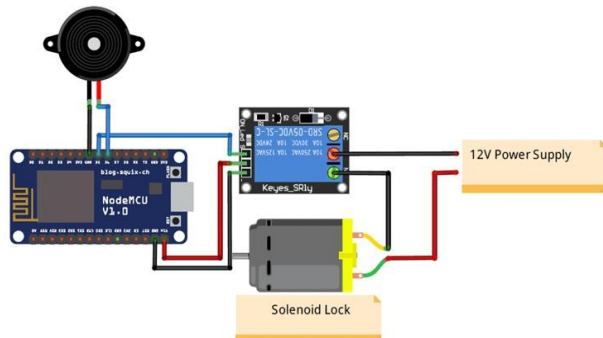
The setup includes an Arduino Uno, an LCD display, a GSM module, and an OTP system. An OTP will be sent to the mobile device and displayed on the LCD. If the OTP is correct, the lock will open, the motor will rotate briefly, and then stop. The motor will then rotate in the opposite direction to automatically lock the door. If the OTP is incorrect, the door will not open. Push buttons will be used to enter the OTP.

## III. LOW COST REMOVABLE (PLUG-IN) ELECTRONIC PASSWORD- BASED DOOR LOCK:

This paper describes a plug-in auto electronic door lock designed with two stages of security and consisting of two sections. The first section, the mobile or cell section, acts as the key and includes a matrix keypad, an LED, and a microcontroller. This section can be carried in a pocket. The second section, which is fixed to the door, remains stationary. When the mobile section is inserted into the static section, the two parts perform a handshake. If the internal handshake between the two microcontrollers fails, the static section will not accept the mobile section. When a valid password is entered, the door lock will unlock the door for 15 seconds before automatically closing it again.

#### IV. DESIGN AND IMPLEMENTATION OF A DIGITAL CODE LOCK:

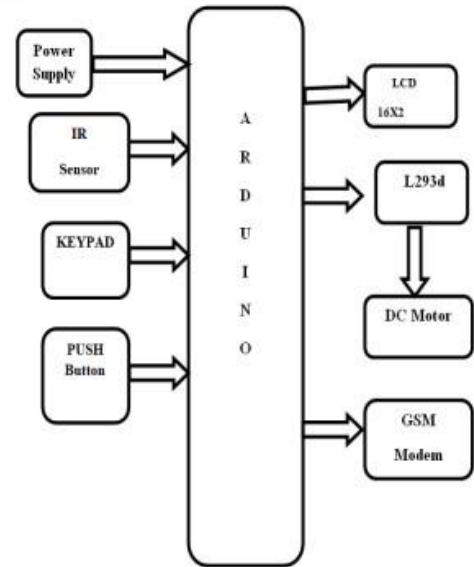
This paper discusses the design and implementation of a digital code lock using a microcontroller. It explains the fundamentals of the digital locking procedure and explores how global system for mobile (GSM) technology contributes to advanced locking techniques through the generation of one-time passwords (OTPs).



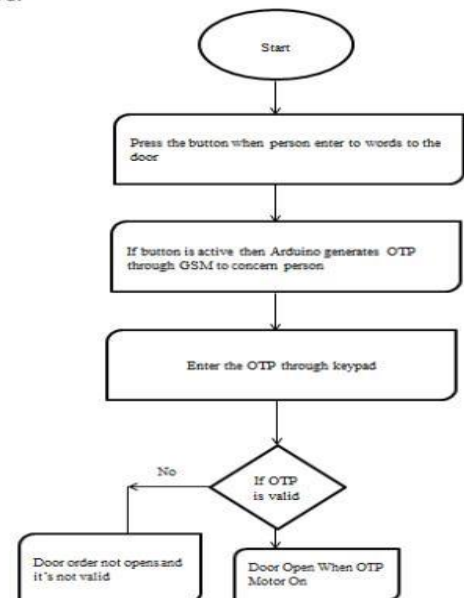
#### V. WORKING PRINCIPLE

The circuit's controlling element is the Arduino microcontroller. It has overall driving unit control. It is frequently employed in communication. The Arduino microcontroller is connected to the GSM module, keypad, buzzer, and LCD screens for power supply. The microcontroller is attached to the figure-print sensor. The Arduino microcontroller serves as the power source for the keyboard, GSM, and buzzer. The circuit will be operated by a motor driver. The 4-digital password is initially typed into the keypad. Each person needs a different password to unlock the door. When the password correctly entered, the door opens; the LCD shows a success message, and the user receives a notification on his mobile device via the GSM module. The GSM module is utilised for message sending and receiving. At first, the keypad is used to enter the 4- digit password. To open the door, each person needs a different password. When the password is correctly entered, the door opens, the LCD shows a success message, and the GSM module sends the user a notification message to his mobile device. The transmission and receiving of message takes place through the GSM module. A fingerprint sensor has been employed for increased security. The fingerprint of the person will be scanned and stored in the databases. When the user enters their fingerprint scanner is accurate. If it is, the door opens; if not, it remains closed until the user who authenticated them kept their thumb print.

#### Block Diagram:



#### Flow chart:



#### VI. OUTCOME:

OTP-based door lock systems offer improved security compared to conventional locks, providing a higher level of protection because the system's unique password is impossible to copy or guess. Additionally, it prevents anyone who has obtained a copy of the key from gaining unauthorized access.

#### VII. SIGNIFICANCE:

##### A. Remote Access and Control:

IoT locks can be managed from anywhere via smartphone apps or web interfaces. This means you can lock or unlock doors remotely, which is particularly useful for allowing access to guests, service providers, or emergency responders without needing to be physically present.

### **B. Enhanced Security:**

IoT locks often come with advanced security features such as real-time notifications, activity logs, and integration with other security systems. This allows users to monitor access and detect any unusual activity immediately.

### **C. Integration with Smart Home Systems:**

IoT locks can integrate with other smart home devices, such as security cameras, alarms, and lighting systems. For example, you can set up automated routines where unlocking the door triggers other smart devices to act, such as turning on lights or disarming an alarm.

### **D. Access Control Management:**

IoT locks allow for more granular control over who has access and when. You can create temporary access codes for guests or service providers, and easily revoke access when it's no longer needed.

### **E. Data and Analytics**

IoT locks can provide detailed logs of who accessed the door and when. This can be useful for tracking usage patterns, identifying security breaches, or even managing employee access in a business setting.

### **F. Automated Locking:**

Many IoT locks can be programmed to lock automatically at certain times or under specific conditions, providing an additional layer of security and peace of mind.

## **REFERENCES**

- [1] Manish Aggarwal "Secure Electronic Lock Based On Bluetooth Based OTP System" Elins
- [2] International Journal of science Engineering & Management (EIJ SEM), Volume-2, Issue-1, Jan 2017, ISSN: 2456-1657.
- [3] Sanji Kumar Dhara, Nilankar Bhanja, Thandassery Vidyall Vikash Supriyo De "IOT Based Digital Door Lock" International Research Journal of Engineering and Technology (IRJET), Volume-08, ISSUE-10, October-2021, eISSN: 2395-0056, p-ISSN: 2395-0072.
- [5] Ajayi –Smart Emmanuel Abiodun "Design and Implementation of Embedded Password Based Security Door Lock System using 8051 microcontroller" International Journal of Digital and Integrated System Engineering Volume-1, ISSUE-1, January2017.
- [7] R.Mohandas, "OTP BASED DOOR LOCK SYSTEM" International Journal for Innovative engineering and Management Research, Volume 12, ISSUE 08, Pages: 162-168.





September 2024  
Vol-14 No:-9  
@ IJITCE Publication